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SOURCE Doklady Akademii Nauk SSSR, Vol LXXI, No 1, 1950.YEARLY VARIATION OF THE POTENTIAL GRADIENT OF ATMOSPHERIC ELECTRICITY

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Submitted 7 Jan 1950, Acad. S. I. Vavilov

Up to now, no one has established whether there is a seasonal variation in the potential gradient V' or, according to P. N. Tverskiy's assumption, whether V' varies simultaneously for the whole world (see Tverskiy's Atmospheric Electricity, 1949).

V' for the northern hemisphere has been sufficiently studied, and most stations give it a simple wave shape with a maximum in winter and a minimum in summer.

By V' for the southern hemisphere is not especially clear, since some stations show a maximum in winter while others show a maximum in summer.

To solve this problem the authors gathered all basic observations on V' for the southern (15 points) and northern hemispheres (45). Since V' were expressed as percents of its average yearly values.

In order to minimize the influence of uneven distribution of observation points according to latitude, the points on each latitude of the northern hemisphere were taken proportional to the number in the southern hemisphere and then totaled by months and averaged for each hemisphere.

From the appended figure, maximum V' in the winter (north) and minimum V' in the summer are attained simultaneously for the whole world. The amplitude of V' for the northern hemisphere averages 48 percent, but for the southern it is 16 percent. Thus, the average amplitude for both hemispheres is 32 percent and is apparently due to some common cause for the whole world, but the second component of the amplitude averages 16 percent and is connected with the change of seasons.

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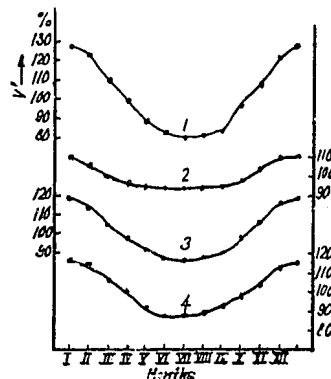
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The probable cause of the simultaneous variation in V' for the whole world must be the yearly fluctuation in surface density of the earth's charge, which (fluctuation) is due to the uneven transfer of charge during thunderstorm activity and precipitation.



Yearly Behavior of the Potential Gradient

- 1 - For northern hemisphere
- 2 - For southern hemisphere
- 3 - Average for both hemispheres
- 4 - For the oceans of both hemispheres

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